WEAPON SYSTEM POLLUTION PREVENTION

MONITOR

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To be added to our mailing list, please write or call:
Human Systems Center (AFMC)
HSC/EMP
8213 14th Street, Bldg. 915
Brooks AFB, TX 78235-5246
Commercial: (210) 536-5452/3406
DSN 240-5452/3406
FAX (210) 536-3228 DSN 240-3228
E-Mail:
JOHN.BIGGS@GUARDIAN.BROOKS.AF.MIL

FEATURE STORY

B-2 PROGRAM WINS AFMC SINGLE MANAGER POLLUTION PREVENTION AWARD

In November 1996, Col William J. Jabour was awarded the Air Force Materiel Command (AFMC) Single Manger Pollution Prevention Award in recognition of his Program's initiative to institutionalize pollution prevention into the life cycle of the weapon system. The B-2 System Program Office (SPO) has met or exceeded all customer pollution prevention (P2) requirements.

Some of the initiatives implemented to meet war fighter needs include the following:

- Screening of Technical Orders (TOs) for Class I and II ODSs, EPA-17 materials, and Hazardous Air Pollutants. All B-2 Specific TO references to Class I ODSs have been revised with appropriate substitutes (see story on page 3)
- Installing a depot level depainting systems that uses wheat starch. This process has resulted in both capital and operating cost savings and has eliminated hazardous waste generation (see related story on page 3).

The teaming effort established under the B-2 Environmental Working Group (EWG) has been the foundation of the program's success (see related story on page 2). Accordingly, this group and the B-2 SPO have been recognized by AFMC for their efforts to institutionalize pollution prevention into the weapon system. Δ

OVERVIEW OF THE B-2 ENVIRONMENTAL WORKING GROUP (EWG)

The mission of the B-2 Environmental Working Group (EWG) is to adequately prepare Air Combat Command (ACC) and the logistic centers for the arrival of the deployed B-2 Bomber. This group has been chartered to provide a forum for the free exchange of pollution prevention technology and health and safety information.

In order to meet its mission, the B-2 EWG includes representatives from the 509th Bomb Wing LC/CE/SG, HQ AFMC, HQ ACC, OC-ALC, Combined Test Force (CTF), ASC/EM, ASC/LP, JGAPP, and Northrop Grumman and its subcontractors. The relationship between team members is summarized in Figure 1 and a listing of team members provided in Table 1.

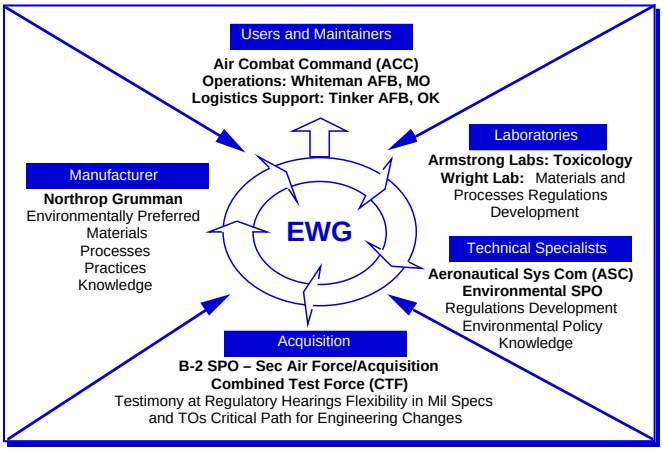

Figure 1. B-2 Environmental Working Group (EWG)

The group meets on a quarterly basis to address key issues that may impact the B-2 program. In addition to the TO revisions and the technological innovations (see page 3), the EWG has been responsible for orchestrating advanced planning for the use of regulated materials on operational bases. Additionally, the team has been instrumental in providing education and training of unique issues related to health and safety concerns, personnel protective equipment needs and emerging environmental issues and USAF policies.

The next B-2 EWG meeting is scheduled for 30 Jan 1997 at Whiteman AFB. Topics for discussion include emissions capture unit for paint/depaint operations and a hazardous materials prioritization database. For further information regarding this meeting or other activities of this group, please contact Capt Jason Herman at DSN 785-9502. Δ

Table 1. B-2 Environmental Working Group Members

Name	Organization	Phone
Capt Jason Herman	ASC/YSOA	(513) 255-9502
Robert Gilmore	R620/UA	(310) 948-8163
Ron Ames	ASC/YSDF	(513) 255-9518
Max Delgado	ASC/EMV	(513) 255-3054
Lt Dan Fenza	ASC/YSOA	(513) 255-9502
Larry Fry	ASC/EMV	(513) 255-3054
Bill Herbort	ASC/YSBM	(513) 255-9433
Dave Hilker	ASC/YSDF	(513) 255-9520
Col Mark Mondl	ASC/EM	(513) 255-2905
Don Tarazano	ASC/EMV	(513) 255-3054
Mike Urig	ASC/YSDF	(513) 255-9518
Bill Abdullah	Q010/UA	(513) 255-9619
Mary Kay Bechtol	LQ020/YB	(513) 255-7607
Paul Brunet	L415/PICO	(513) 255-6754
Vanessa Damrow	LQ020/YB	(513) 255-6279
Tim Haltmeyer	Q010/UA	(513) 255-4747
Jerry Harrison	LB811/4S	(513) 255-5343
Dennis Kush	NG ILS	(513) 255-0407
Michael Martin	Q010/UA	(513) 255-0235
Rick Osterman	T202/GK	(310) 942-5913
Mark Ross	LQ020/YB	(805) 272-7049
Michael Steele	T202/GK	(310) 948-8418
Al Silts	Z110/GG	(310) 948-1722
Jim Yin	T202/GK	(310) 948-0140
Jim Butcher	OC-ALC/YSSS	(405) 739-2806
Robin Lee Eitelman	OC-ALC/EMV	(405) 734-7071
Sam Williams	OC-ALC/YSSA	(405) 739-2646
Ross Chambers	509 CES/CEV	(816) 687-6265
MSgt Troy Holbrook	509 LSS/LGEV	(816) 687-3452
Capt Kirk Phillips	509 AMOS/SGPB	(816) 687-4324
MSgt Tom Tally	509 LSS/LGEV	(816) 687-1983
MSgt Sherm Teuscher	509 AMOS/SGPB	(826) 687-4324
Herb Roraback	CSC (B-2 CTF Env)	(805) 275-8854
Capt Sheila Scott		(805) 275-5121
Mark Taberner	CSC (B-2 CTF Env)	(805) 275-8854
Gregory Cecere	WL/MLBT	(513) 252-2144
Stephanie Flanagan	WL/MLSE	(513) 252-7482
Lois Gschwender	WL/MLBT	(513) 252-7530
Shashi Sharma	WL/MLBT	(513) 252-9029
Ed Snyder	WL/MSBE	(513) 252-9036

OVERVIEW OF THE B-2 PROGRAM TECH ORDER ODS REVIEW PROCESS

Methodology:

Figure 2 summarizes the process used by the B-2 Program to conduct its ODS review of Technical Orders (TOs). Materials that were identified in this review included Class I and II ODS, EPA-17 Industrial Toxins and Hazardous Air Pollutants (HAPs). Where alternative materials were available, the B-2 Program eliminated references to ODS by preparing an interim operational supplement that specified a replacement. Where an alternative was not available, the B-2 Program sought a waiver for continued ODS use.

Figure 2. B-2 Program's Technical Orders ODS Review Process

Results:

Using the process outlined in Figure 2, the B-2 program has reviewed 536 of 700+ Technical Orders which include original manuals, changes, and revisions. References to ODS for the B-2 Program were found in the six categories outlined in Table 2. As of January 1996, 192 references to Class I ODS were found in Manuals. Only ten (10) of these references (i.e., Halon and R-12) have required a waiver. For further information regarding this initiative, please contact Capt Jason Herman at DSN 785-9502. Δ

Table 2. Reference Categories to ODS for the B-2 Program

General Category	Class I ODS
Cleaning Compounds/Solvents	1,1,1 Trichloroethane and CFC-113
Release Agents	CFC-113 as Component
Corrosion Inhibiting Compounds	Various CFCs to Improve Penetration
Thread-Locking Primers	1,1,1 Trichloroethane
Fire Extinguishing Agents	Halons
Refrigerants	R-12

CASE HISTORIES OF POLLUTION PREVENTION TECHNOLOGY CHANGES FOR THE B-2 PROGRAM

Wheat Starch Depaint Technology: Environmental regulations have driven the elimination of methylene chloride based chemical paint strippers in the Air Force. In response to these requirements, the B-2 Program has approved the use of the Wheat Starch Depaint Technology for stripping aircrafts. Approval for use of this technology was made after extensive evaluation to ensure the safety of the composite material being stripped was maintained.

The wheat starch stripping facility for the B-2 Program is located in Palmdale, CA at USAF Plant 42, Site 3. Depainting a B-2 aircraft requires 100,000 lbs of wheat starch and has a cycle time of six days. The process generates 10,000 lbs of waste wheat starch which is disposed as non-hazardous waste. The process has a strip rate of 0.3-1 ft^2/min, nozzle pressure between 25-35 psi, and a media flow rate of 6-10 lb/min. The facility currently has eight operational stripping hoses.

The benefits of the wheat starch technology over traditional chemical stripping methods include:

- reduction in fugitive air emissions
- elimination of a hazardous waste stream; residual waste from process is categorized and disposed of as non-hazardous waste
- minimization of worker exposure to hazardous chemicals.

(Case Histories continued from Page 3)

Aqueous Tube Cleaning: In an effort to replace 1,1,1-Trichloroethane (TCA) vapor degreaser, the B-2 Program has approved the use of an aqueous cleaning system for interim cleaning of hydraulic and oxygen tubes and the final cleaning of hydraulic tubes. The selected aqueous cleaning system includes a Proceco Spray Cabinet (a manifold flushing system) and three approved aqueous cleaners (Brulin 1990 GD, Rebound 7, Turco Sprayeze LT). The aqueous system has been tested and validated to ensure it meets NAS 1638, Class 6 Cleanliness requirements for hydraulic tubes. The qualification test criteria used for approval of aqueous cleaners is summarized in Figure 3. The three selected cleaners pass all these test requirements.

Qualification Criteria
➡ Foaming
➡ Solubility
➡ Immersion Corrosion
➡ Conversion Coating Compatibility
➡ pH
➡ Sandwich Corrosion
➡ Soil Removal

Figure 3. Test Criteria Used to Qualify Aqueous Cleaners

In addition to the environmental benefits, this technology change has reduced cycle time from five days to several hours with associated cost savings of $1,000/day.

Hydraulic Fluid Purification: Currently, the B-2 Program is evaluating the use of an oil purifier (Pall Unit) for cleaning MIL-H-5606 Hydraulic Fluid. The system removes water, volatiles, and particulates. The purified oil meets the requirements of MIL-H-5606 (for ball wear, moisture, particulates, and volatile concentration). Air Force approval of the technology is pending pump test results.

For further information regarding these technologies, please contact Capt Jason Herman at DSN 785-9502. Δ

AERONAUTICAL SYSTEMS CENTER (ASC) PLACES EMPHASIS ON ACQUISITION POLLUTION PREVENTION

The primary goal of the Acquisition Environmental Program at Aeronautical Systems Center (ASC) is to reduce and eliminate hazardous material by using substitutes, benign chemicals and innovative technologies as part of the acquisition programs' systems engineering process. This in turn saves millions of dollars in future chemical treatment and disposal cost, as well as avoids environmental compliance requirements associated with maintaining permits to use, emit, and dispose of hazardous chemicals.

Within the environmental cost hierarchy, preventing pollution provides the greatest life-cycle costs to a weapon system because the hazardous materials do not have to be disposed of, recycled or treated. Since there are fewer hazardous chemicals in the workplace, occupational health and safety costs are also reduced. Studies show that for every dollar spent on hazardous material, it takes another $80 to either recycle, treat or dispose of the chemical over the life of a weapon system.

The Acquisition Pollution Prevention Program at ASC has taken the up-front planning as well as the cradle-to grave responsibility of the management of hazardous materials in the weapon systems. The team at ASC/EM and the Environmental POC co-locates at the SPOs (See Tables 3 and 4 on page 5) are forming partnerships through various Integrated Product Teams and Environmental Working Groups to address key environmental requirements for weapon systems. Some of the successes include the following:

B-2 PROGRAM INCORPORATES ENVIRONMENTAL ANALYSIS INTO THE ACQUISITION DECISION MAKING PROCESS

The B-2 System Acquisition Management Plan addresses the program's effort to institutionalize pollution prevention. Some of the highlights of this effort include the following:

- A Programmatic Environmental Analysis (PEA) was completed for the program that will now be transformed into a Programmatic Environmental Safety and Health Evaluation (PESHE).
- An Environmental Assessment (EA) was completed for the B-2 depot maintenance alternatives - no significant impacts were found.
- The B-2 Environmental Process Team (EPT) was established to institutionalize pollution prevention into the B-2 systems engineering process. The EPT, which is a sub-IPT of the B-2 EWG, reviews all contract and engineering changed documents for environmental impacts and P2 opportunities. Δ

- Through partnership with industry, the F-15 Environmental Working Group (EWG) cut the aircraft's use of ODCs by 86% from the 1992 baseline.
- The C-17 is spearheading the JGAPP's initiative to eliminate the use of approximately 8,500 lbs/yr of chromium by applying non-toxic paint primer to Air Force, Army, Navy, and Marine Corp aircraft.
- Early in the design phase of the F-22, pollution prevention principles were used to eliminate the use of ODCs and hazardous materials such as chromium and cadmium. Touted as the Air Force's first "green aircraft", the F-22 has institutionalized pollution prevention through the systems acquisition process.

Table 3. ASC/EM Points of Contact

Name	DSN	E-mail
Perry Beaver	785-3054 ext. 317	beaverpl@emsmtp.wpafb.af.mil
Alex Briskin	785-3054 ext. 309	briskin@emsmtp.wpafb.af.mil
Maj Jeff Byer	785-3054 ext. 310	byerjv@emsmtp.wpafb.af.mil
Maxmio Delgado	785-3059 ext. 329	delgadom@emsmtp.wpafb.af.mil
Charles Jones	785-3059 ext. 311	jonescl@emsmtp.wpafb.af.mil
Lt Col Gil Montoya	785-3054 ext. 308	montoytg@emsmtp.wpafb.af.mil
Mayank Patel	785-0259 ext. 312	patelmm@emsmtp.wpafb.af.mil
Capt Craig Smyser	785-3059 ext. 345	smyserca@emsmtp.wpafb.af.mil

Table 4. ASC/SM Points of Contact

Name	Function	DSN	E-mail
Samantha Durham	YPR6/F-16	785-5641	durhamse@ypmail.wpafb.af.mil
Lavera Floyd	FBM	785-2406	floydl@ascfb.wpafb.af.mil
Capt Brian S. Freeman	RAS	785-1747	freemanbs@amc1mail.wpafb.af.mil
Capt Jason Herman	YSIR/B-2, FBM	785-9502	hermanjt@email.wpafb.af.mil
Major Penny Kretchmer	YT	785-3339 ext. 433	kretchpp@yp.wpafb.af.mil
1Lt Robert Reed	YCA/C-17	986-9311	reedrd@c-17IGP.wpafb.af.mil
Brian Townsend	YFEM/F-22	785-0744 ext. 3246	townsendbm@asc-yf.wpafb.af.mil
Maj Blane Wampler	SM/LPA PSO	785-2596	wamplerbl@sm1.ascsm.wpafb.af.mil
Capt Frank Wilson	LFDN/F-15	785-4173 ext. 2431	wilsonf@vf.wpafb.af.mil

- In November 1996, the B-2 Program was awarded AFMC Single Manager Pollution Prevention Award (see related stories on page 1 to 4)

For further information regarding ASC's Pollution Prevention Program, please contact LtCol Gil Montoya at DSN 785-3054 ext. 308.

This article was submitted by Ms. Larrine Barr, ASC/PA. Δ

A NOTE OF THANKS

The MONITOR would like to thank Mr. Perry Beaver (ASC/EM) for opening the doors to the SM POCs at both ASC and WR-ALC. As a result of this initiative, the MONITOR will begin to feature the environmental activities of the different weapon systems. If you have any suggestions of articles and/or topics that you would like to see in the MONITOR, please contact Mr. John Biggs at e-mail: John.Biggs@guardian.brooks.af.mil.

WEAPON SYSTEM POLLUTION PREVENTION

SAF/MIQ ESTABLISHES INTERIM POLICY ON ENVIRONMENT, SAFETY, AND HEALTH (ESH) MANAGEMENT SYSTEMS

On 31 Dec 1996, SAF/MIQ distributed a memorandum stating that the Air Force does not support or endorse payment for third party certification of Environmental Management Systems (EMS), except in those circumstances where individual locations have demonstrated that certification benefits exceeds costs. In most cases, the Air Force's benefit from third party certification is limited because of its existing audit program and its commitment to open communication with the public and local/state regulators.

In summary, the Air Force supports quality-based management practices which uses a systematic method of planning, taking action, and checking results. Such systems for ESH must be compatible and integrated, where appropriate, to minimize customer impact, enhance productivity, and reduce life-cycle costs. However, a third party certification is not necessary to meet these needs. For further information related to this interim policy, please contact Lt Col John Garland, DSN 227-1019. Δ

THE JOINT STRIKE FIGHTER (JSF) PROGRAM INTEGRATION OF HAZARDOUS MATERIALS MANAGEMENT REQUIREMENTS

An article on the JSF Program appearing in the 18 December 1996 Defense Environmental Alert caused quite a bit of confusion recently. The article noted that the JSF Concept Demonstration Phase (CDP) Request for Proposal (RFP) did not require compliance with the National Aerospace Standard 411 (NAS-411), "Hazardous Materials Management Program."

Based on this, the article indicated that the JSF Program had dropped all requirements for Hazardous Materials management from its $2.2 billion CDP contracts awarded in November 1996. This implied that the JSF Program did not have to comply with the DoD Regulation 5000.2, Paragraph 4.3.7.4, requirement that all DoD programs must manage Hazardous Materials.

In reality, the JSF Program has taken a very innovative approach to integrating Hazardous Materials management (and other Environment, Safety and Health (ESH) requirements) into its CDP contracting documents. The JSF CDP RFP did not have a separate section that dealt with ESH issues as stand alone requirements. Instead, the JSF Program wove the individual ESH requirements into the appropriate sections of its 22 March 1996 CDP RFP.

The JSF Program integrated its Hazardous Materials management requirements into the "Affordability Analysis and Demonstrations" section of its Statement of Objectives (SOO). This section required the contractors to increase affordability by reducing initial product costs and life-cycle costs. The JSF RFP required that offerors specifically address life-cycle cost savings achieved from new design and manufacturing approaches, new tooling concepts, acquisition process improvements, and Hazardous Materials minimization. In this way, the JSF Program made Hazardous Materials management a priority while giving the contractors the flexibility as to how they will specifically accomplish it.

In addition to the RFP SOO Hazardous Materials management requirements, the JSF Program also integrated other ESH requirements throughout the RFP. Examples include the following.

- Section H, Special Contract Requirements, included Environmental Controls.
- Section I, Contract Clauses, included the following FAR Clauses
  - FAR 52-223-2, Clean Air and Water,
  - FAR 52-223-7, Notice of Radioactive Materials, and
  - FAR 52-223-14, Toxic Chemical Release Reporting.

In their proposals, the contractor Statements of Work (SOW) included the integration of ESH considerations, including Hazardous Materials minimization, into their Systems Engineering and trade study approaches. Thus, the JSF Program has made significant progress towards achieving the overall DoD Regulation 5000.2, Paragraph 4.3.7, mandate to "integrate ESH issues into the Systems Engineering process."

This article was submitted by LtCol Forbes, SAF/AQRE. Δ

Q&A: AN OVERVIEW OF ISO 14000

Q. What is ISO 14000?

A. The International Organization for Standardization (ISO), has undertaken the development of international voluntary environmental management standards through the ISO Technical Committee 207. The TC 207 is developing a set of standards that provides an organization with a systematic approach to environmental management. These standards, known as the ISO 14000 series, are designed to help an organization better manage all aspects of their operations. They are based on the premise that good environmental management practices lead to lower costs, higher quality products, greater productivity, and improved environmental stewardship.

Q. What are the Environmental Management Standards?

A. The ISO 14000 Environmental Management Standards (EMS) are a series of standards and guideline reference documents. What sets these standards apart is their focus on "management" over prescriptive "performance" requirements as found in many of our standards today. An EMS is intended to help an organization establish and meet its own goals through objectives and targets, organizational structures and accountability, management controls and review functions with top management playing an integral role. The EMS standards DO NOT set specific requirements for environmental compliance or specific levels for performance. Performance is driven by the goals and objectives established by the organization. Environmental PERFORMANCE is improved by insuring the EMS provides for environmental policies which include: specific environmental performance goals and objectives, a commitment to regulatory compliance with environmental laws, pollution prevention, and continuous improvement of the management system.

Q. How is the Federal Government getting involved?

A. The Department of Defense (DoD), General Services Administration, Occupational Safety and Health Administration, Nuclear Regulatory Commission, and others in the Federal Government are examining the usefulness of ISO 14001 (establishes EMS specifications) for the context of their regulatory and procurement programs. Additionally, the US Department of Energy has announced it would require ISO 14001 or similar certification for certain contractors by 1997. The Environmental Protection Agency (EPA) and state environmental agencies are monitoring ISO 14000 development and the EPA is even advancing its own approach called CEMP (Code of Environmental Management Principles), but view an ISO 14001 approach as satisfying Executive Order 12856's requirement for Federal Agencies to adopt environmental principles to guide their operations. In May 1996, the DoD established a tri-service working group to review the standard. The Office of the Undersecretary of Defense for Environmental Security has called for pilot programs empowering the Services to independently investigate the standard, however discourages registration until the benefits or third party verification are better understood.

This article was submitted by Mr. Joe Hollingsworth, Concurrent Technologies Corp. (CTC). Δ

WWW Site for ISO 14000

- ISO 14000: The Full Text is Available on Internet
  Address: http://www.dep.state.pa.us/dep/deputate/pollprev/ISO14000/ISO14000.htm

  Pennsylvania Department of Environmental Protection has a WWW site that provides the full text of ISO 14000 and related standards:
  - Committee Draft of ISO 14000
  - ISO 14001 Environmental Management Systems–Specifications for Use
  - ISO 14010 Guidelines for Environmental Auditing, General Principals
  - ISO 14011 Guidelines for Environmental Auditing, Audit Procedures, Auditing of Env. Mgt. Systems
  - ISO 14012 Guidelines for Environmental Auditing Qualification Criteria for Environmental Auditors
- Introduction to ISO 14000
  Address: http://iso14000.com/iso14000intro.html
- ISO 14000 Discussion Group
  Address: http://www.quality.org/qc/lists/iso14000.faq
- Global Environment & Technology Fund Web Site
  Address: http://www.iso14000.org

U.S. AIR FORCE COMMAND CORE SYSTEM

The Command Core System is a government owned relational database system developed using Oracle's Relational Data Base Management System. The system was designed to provide the Air Force an integrated environmental, occupational health and safety information management system. This system allows you to perform all necessary tasks related to the maintenance, reporting, and use of the environmental and health data required by your organization as well as most major regulatory agencies. The system is composed of eight major modules associated with information related to employees, pollution prevention, industrial hygiene, material management, occupational health, shared functions, safety, and waste management (see Figure 4 for overview).

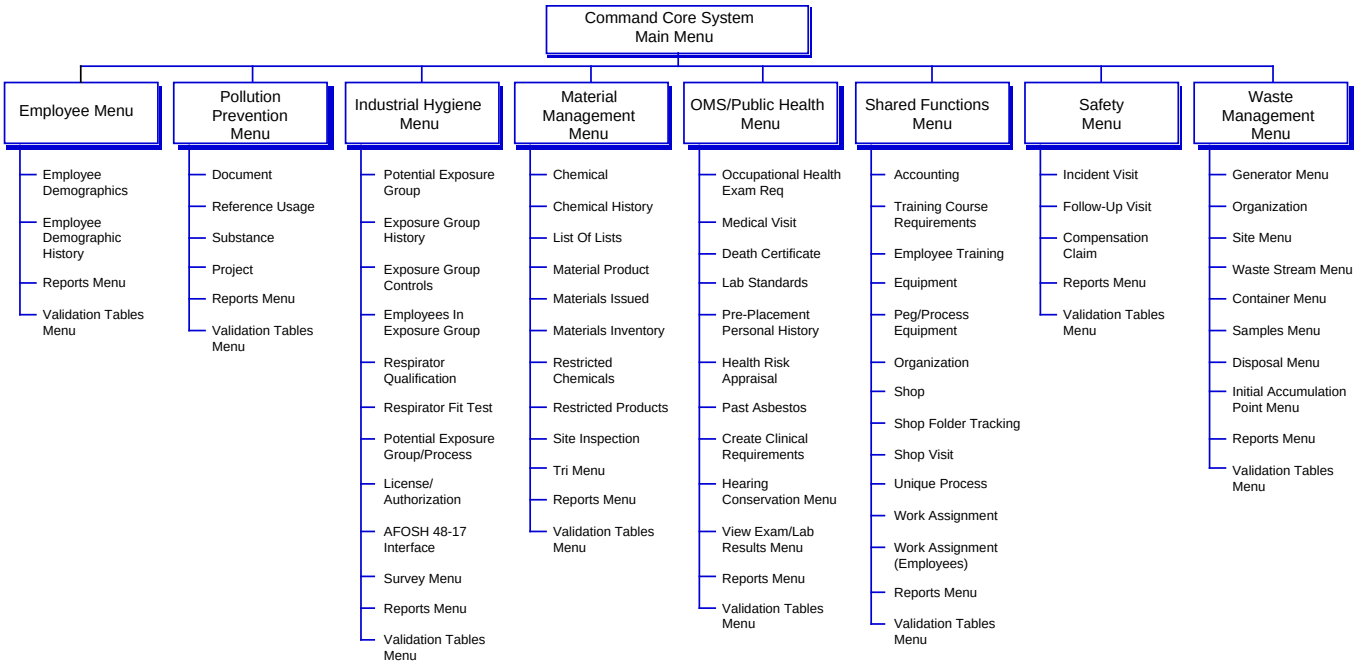

Figure 4. Overview of Command Core Menu

The system can interface with many material tracking and inventory databases including the Depot Maintenance Hazardous Material Management System (DM-HMMS) which is used at most of the Department of Defense depots. It can also accept hearing conservation data used in the DoD HEARS system. A project has been submitted to Health Affairs to interface the system with the Composite Health Care System (CHCS) to download patient clinical lab and x-ray data.

In its present configuration, the database is hosted on a Hewlett Packard 9000 UNIX server. The client-server design allows the system to be accessed from a variety of wide area and local area network environments that are used at military installations. As a minimum, personal computers running the Command Core System require the following capabilities: Windows, 486/33 processor, 16 megabytes of RAM, and 80 megabytes of free hard disk space.

As of January 1997, it has been deployed to all five Air Force depots and to the seven product and test centers throughout Air Force Materiel Command. Plans call for further deployment in 1997 throughout installations at every Air Force major command. We are working with the Tri-Service Occupational Health Working Group and the Army Executive Agent for Occupational Health to consider this application in the Integrated Decision Plan and Migratory Study for the Defense Occupational Health Readiness System (DOHRS). More details on the system can be found on the World Wide Web with the home page address: wwwsam.brooks.af.mil/commandcore/homepage.html-ssi. For further information, please contact Col Joyce at DSN 785-6815, commercial (513) 255-6815.

This article was submitted by Col Joyce, HQ AFMC/SGPB. Δ

AIR FORCE PROPOSES JP-8 ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH (ESOH) STUDIES

The Clean Air Act of 1990 requires that the Air Force have accurate and complete emissions data related to JP-8 fuel use. This data will assist the bases that use JP-8 fuel to support aircrafts, conduct air quality analysis, such as, conformity analysis and Title V permit compliance monitoring and reporting. Many of these environmental emission studies are underway but the information is not currently available. Additionally, the United States Environmental Protection Agency (USEPA) has recently proposed tougher air quality criteria and national ambient air quality standards (NAAQS) for particulate matter and ozone (see 13 Dec 1996 "Federal Register"). Future studies of particular interest include the health effects to workers exposed to JP-8.

Specific safety and health drivers to conduct JP-8 ESOH studies include the following: 1)complaints from bases on ground crew exposure during cold engine starts; 2) dermal impact noted by medical officers as well as respiratory tract concerns; 3)oil residual surfaces from exhaust emissions indicating a high level of unburned fuel

The United States Air Force is taking the initiative to establish an unified research approach to the ESOH issues related to JP-8 jet fuel use. Additionally, the DUSD(ES) has signed an agreement with Norway for a joint study on the toxic effects of jet fuels. The proposed studies listed in Table 5 represent the minimum requirements needed to understand the current ESOH impact from the use of JP-8 fuel.

Table 5. Proposed JP-8 ESOH Studies

Project Title	Customer	Project Description/Anticipated Project Start Date
Exposure Characterization - AL/OEM		
OEMI Field Studies	AFMC/AL	Conduct exposure assessment on ground crew personnel using total aerosol mass industrial hygiene techniques (1997)
Occupational C-130	AFMC/SG	C-130 Exhaust Respirable Aerosol Characterization Study (facility exhaust maintenance) (1997)
Occupational Jet Engine	ACC/SG	F-15/F-16 Exhaust Inhalable Aerosol Characterization Study (facility exhaust maintenance) (1998)
Toxicity Assessment - AL/OET		
Tox-Dermal (animal)	AFMC/S&T SAF/AQRT	28 Day Dermal Toxicity Study (Rat Model) (1998)
Tox-In Vitro (human)	AFMC/S&T SAF/AQRT	Dermal Absorption (Human Skin) to determine length of time to get safe body burden through the skin (1998)
Tox-Aerosol (animal)	AFMC/S&T SAF/AQRT	28 Day Aerosol Toxicity Study (Rat Model) to characterize and understand the potential for toxicity associated with exposure to aerosol atmospheres (1999)
Emissions Characterization/Environmental - HSC/YAL-AL/OEB (first three), AL/EQ (last four)		
EPA Emission Test	AFMC/CEVV	7 engines plus 2 APUs emission sampling and analysis to update AQUIS and satisfy EPA reporting (1997)
EPA Emission Test	AETC/LG/ CEVV	3 engines emission sampling and analysis to update AQUIS and satisfy EPA reporting (1997)
EPA Emission Test	AFMC/CEVV	5 engines emission sampling and analysis to update AQUIS and satisfy EPA reporting (1997)
Emissions Modeling JP-8	AFMC/CEVV	Complete development of upgraded modeling system in coordination with FAA for assessing the on-and-off-base environmental impact of air pollutant emissions from aircraft engines, ground vehicles, support equipment, fuel storage areas, and indirect (induced) sources (1998)
Env Fate of Dumped JP-8	AFMC/CEVV	Model the liquid/vapor partition of key JP-8 components during jettisoning. Evaluate the atmospheric chemistry of volatile components (1997)
JP-8 Emissions Factors	AFMC/S&T	Determine correlation between fuel composition and exhaust product measurements. Develop emissions factors for HAPS based on fuel composition (1997)
JP-8 Emission Monitoring	AFMC/S&T	Develop and demonstrate a system to monitor and quantify criteria pollutants emissions and selected HAP emissions from aircraft engines burning JP-8 and collect data using this system (1999)

For further information, please contact Maj Les Smith, AL/OEM at DSN 240-6119. Δ

FACILITATING ACQUISITION OF ALTERNATIVES THROUGH PERFORMANCE BASED STANDARDS

Performance based specifications identify user needs, part interfaces, supportability requirements and the operating environment for a product. In short, they are designed to identify form, fit, function and interface requirements and also establish the criteria with the focus on the expected performance. Many current and past military specifications have not been performance based, but were recipes for materials or equipment the military wanted, with little room for change. However, some specifications, like some cleaning specifications, allowed the manufacturer wide latitude for ingredients as long as the performance requirements (corrosion, flammability, etc.) were met.

Performance based standards alleviates the oversight and cost burden placed on contractors for compliance with many military specifications when performing military acquisitions. In other words, the contractor can control the process by which a product is developed. This approach has been accepted by DoD Secretary of Defense, Dr. William Perry, who has mandated a DoD-wide military specification reform. The current trend is to cancel many military specifications with no replacement and adopt industry specifications and standards. Some military specifications are being rewritten as performance based specifications or as detail specifications. Military specifications with no industry equivalents will remain as is. The trend is that there will be comparatively few DoD owned specifications.

Key Points to Consider When Facilitating Acquisition of Alternatives

1. **Building the specification framework around the user's requirements, clearly defining how alternatives are to be used, and keeping potential users in the decision-making loop.**

   The specification should meet form, fit and function requirements such as materials compatibility, physical/chemical characteristics, environmental, occupational health, and safety. The alternative must be compatible, that is, not have any adverse impact on the materials it is used on/with. Physical/chemical characteristics often drive environmental factors such as biodegradability. The impact to waste treatment plants must be considered. Be aware of new and forthcoming regulations which might have an impact and take into consideration health related issues. Make sure potential alternatives are not excluded and use phrases such as "no materials found in CFR XYZ shall be used…" carefully for such a phrase may leave the door open for use of worse alternatives/materials.

2. **Mirroring initial testing of the alternatives to specification development. The applicable tests (e.g., from American Society of Testing Materials) should be identified prior to testing and used to develop a pass/fail criteria for testing results.**

   Materials performance and compatibility must be properly identified. These are easily defined through the use of ASTM or other test methods. Environmental characteristics are harder to identify - what is biodegradable in one waste treatment plant will not biodegrade in another. Occupational health and safety are important considerations. Talk to occupational health and safety experts and get their input. Toxicity testing is expensive, and the results must be examined by experts. Additionally, you may be testing something they are never going to approve. Finally, interface with the potential user and see if they have any problems with the proposed alternatives. For example, they may object to the odor of the alternative.

   Some form of qualified list is needed to identify alternatives which have met the required independent testing. If there is no list, suppliers need to demonstrate compliance to the specification and provide testing results performed by an independent laboratory where tests results will not be biased. Do not accept words such as "equivalent" or "meets requirements" without proof. Material Safety Data Sheets (MSDSs) are not always totally reliable as formulations can change and the MSDS in your database may not be current. Also, manufacturers often do not want to identify some materials for proprietary reasons. Non-hazardous materials may not be listed in the MSDS. Non-hazardous materials can affect a waste treatment plant or be harmful to your equipment.

   Moving to aqueous or less hazardous alternatives can lead to other problems. Surfactants which are often present in aqueous type cleaners can play havoc at your industrial waste treatment plant. Good management practices may solve this problem. Slowly acclimate the microorganisms to the new food by initially trickling the new food to them. Also, stagger tank discharges to reduce amounts in the system at any given time. This can prevent upsetting the system.

3. **Establishing realistic goals and keeping in mind the intended uses and potential misuses.**

   The bottom line is to be careful when making changes and look at the big picture. Only go to new alternatives if all else fails. Be sure to compare the qualification data and consider how clean is clean. Coordinate all changes and make sure proper test and evaluation has been accomplished.

The use of performance based standards can bite the unwary developer or user. If the requirements are poorly defined, materials/equipment bought to the specification may not work with existing equipment or be compatible with existing materials. If the specification is too tight, manufacturers may not want to make the product.

ESH evaluation is very important when dealing with chemicals. For example, Product A bought to meet a performance specification passes the ESH evaluation. Product Z bought to the same specification and possibly having the same NSN but a different chemical composition, may not trigger an evaluation and is considered as safe as Product A. The ESH evaluation is critical as many new chemicals are being developed and included in products sold to the Air Force for similar purposes.

Source: Mr. Brian Ballew, SA-ALC/TIEM, DSN 945-7391. Δ

CLEANING AGENTS FOR SIGNATURE CONTROL MATERIAL INSTALLATION AND REPAIR

Naval Surface Warfare Center, Carderock Division (NSWCCD) has completed a comprehensive laboratory evaluation of technically acceptable, less hazardous alternative solvents to the ozone-depleting substance, 1,1,1-trichloroethane (TCA), as a cleaning agent for signature control materials prior to adhesive bonding.

Seven candidate solvents were identified for testing. Criteria established to aid in the selection of candidate solvents required each solvent to:

1. **Pass an environmental, safety, and health review and an administrative toxicity assessment**
2. **Clean as well as or better than TCA**
3. **Leave no undesirable residue that would adversely affect adhesive bond strength.**

NSWCCD prepared the passive countermeasure system and shipboard acoustic treatment specimens in accordance with Standard Material Application Procedures and cleaned them with the candidate solvents, to evaluate the cleaning ability and resulting residue of each. NSWCCD determined the effect of the cleaner on the adhesive bond strength by measuring the linear peak, maximum, minimum, and average stresses of each specimen. NSWCCD also conducted a cost-benefit analysis to compare the direct and indirect costs and assess the economic impact of each candidate solvent.

NSWCCD found four solvents now available through the Federal Stock System to be technically acceptable alternatives for TCA for surface preparation procedures during the installation and repair of signature control materials:

For passive countermeasure system materials: Breakthrough, PF-145HP High-Performance Degreaser, Positron, and PF Degreaser; and
For shipboard acoustic treatments: Breakthrough, PF-145HP High-Performance Degreaser, and PF Degreaser

Solvent	NSN	Unit of Issue
Breakthrough	6850-01-378-0666 6850-01-378-0698 6850-01-378-0679	55 gallons 15 gallons 5 gallons
PF-145HP	6850-01-377-9360 6850-01-377-9710 6850-01-378-0044	55 gallons 5 gallons 6 gallons (1 gal/container)
PF Degreaser	7930-01-328-4058 7930-01-328-2030 7930-01-398-1027 7930-01-328-5960	55 gallons 5 gallons 3 gallons 6 gallons (1 gal/container)
Positron	6850-01-412-0028 6850-01-412-0026 6850-01-411-8815	55 gallons 6 gallons 1 gallon

Here are the national stock numbers (NSNs) for the alternative solvents *(see table above)*.

*Reprinted from the Dec 96 CFC*Halon News. Original article by Ms. Mary Wenzel, US Navy NSWCCD, tel. (301) 227-5245/DSN 287-5245/wenzel@metals.dt.navy.mil. These and many other products are listed in the DLA Environmental Products catalog. POC Stephen Perez, tel. (804) 279-6054/DSN 695-6054/sperez@dscr.dla.mil.* Δ

INFORMATION CROSS-FEED

WEAPON SYSTEM POLLUTION PREVENTION APPLICATIONS COURSE

AFMC is offering a pollution prevention applications course at the product and logistic centers. The objectives of the course is as follows: provide information that will assist in integrating pollution prevention initiatives into Acquisition and Systems Engineering processes; provide information on resources and tools available to incorporate pollution prevention; and provide information on hazardous material identification, evaluation, and selection of alternative materials/processes. This course is recommended for Systems Engineers and Single Manager Functionals working with Weapon Systems.

The course provides information about the motivating factors for implementing pollution prevention programs within aerospace weapon systems development and acquisition. Topics in this area include life cycle policy, cost, toxicology, health considerations, and environmental laws. The course also covers industrial processes, materials, technology developments and alternatives, focused in the area of hazardous materials and pollution constituents. Acquisition mechanisms for pollution prevention such as developing and incorporating pollution prevention requirements into contracts, statements of work, source selection criteria, and other acquisition documentation are included in the course.

The course schedule is listed in Table 6 with the center point of contact (POC) and their telephone number. For additional information about the course, please contact 2Lt Saulo Cepeda, ASC/EME, at DSN 785-3054, ext. 314. Δ

Table 6. Course Schedule

Date	Location	POC	DSN
17-21 Feb	ASC, Wright-Patterson AFB, OH	2Lt Saulo Cepeda	785-3054 ext. 314
05-06 Mar	ASC, Eglin AFB, FL	Dr. Odin Toness	872-3310 ext. 261
19-20 Mar	ESC, Hanscom AFB, MA	Mr. Andy Dastous	478-8263
09-10 Apr	OC-ALC, Tinker AFB, OK	Mr. Fred Hall	844-7071
05-06 May	SA-ALC, Kelly AFB, TX	Ms. Jeanette McHaffey	945-7391
08-09 May	HSC, Brooks AFB, TX	Mr. Earl O'Carroll	240-2190
21-22 May	SM-ALC, McClellan AFB, CA	Capt Allen Naugle	633-3672 ext. 316
29-30 May	WR-ALC, Robins AFB, GA	Capt John Lindell	468-1124
04-05 Jun	OO-ALC, Hill AFB, UT	Maj Norm LeClair	777-6655

SHOP-LEVEL POLLUTION PREVENTION TRAINING WORKSHOP

To fully institutionalize Pollution Prevention and environmental matters, the process owner must take full ownership and become "informed consumers" in order to solicit optimal support. Since the best ideas originate from shops, these personnel must be trained to facilitate institutionalization. To this end, AETC developed a Shop-Level Pollution Prevention Training Manual through the combined efforts of the Environmental, Safety, and Occupational Health (ESOH) team (LG, CE, SG, and SE). The manual is now available to all process owners interested in pollution prevention. The next step to institutionalize pollution prevention requires training shop-level personnel to recognize and implement their ideas.

The first shop-level pollution prevention train-the-trainer workshop was held on 10-13 December 1996 at Randolph AFB, TX. All AETC installation LG Environmental Coordinators were invited, along with their base ESOH team members. Also in attendance were representatives from other MAJCOMs and Service branches. The course was designed to equip attendees with the skills and tools necessary to lead base-wide pollution prevention training efforts. The last half of the workshop provided each trainee the opportunity to teach a portion of the training manual to a group for instant feedback. All materials needed to teach the course at base level were also provided to the trainees.

If you were unable to attend the workshop, the manual is available on the HQ AETC LG File Transfer Protocol Server, which can be found at 131.44.81.8 through the internet. Disk copies are also available upon request by contacting MSgt Ed Vogel at DSN 487-6850 or fax DSN 487-6054, or e-mail vogele.aetclg@mhs3.aetc.af.mil. Δ

SUMMARY OF THE INTERNATIONAL CONFERENCE ON OZONE PROTECTION TECHNOLOGIES

The International Conference on Ozone Protection Technologies was held 21-23 Oct 1996 in Washington D.C. Key topics of discussion have been summarized below.

FIRE SUPPRESSION ALTERNATIVES FOR HALONS - developing alternative fire suppression technologies for Halon continues to receive major DoD emphasis. The DoD Next Generation Fire Suppression (NGP) Technology Program, which is sponsored by the Office of the Director, Defense Research and Engineering (ODDR&E), will invest $46 million dollars over an eight year research program to develop new suppression technologies for Halon 1301.

The goal of the NGP is to develop and demonstrate by year 2004, Halon 1301 alternative technologies that are easily retrofitable (i.e., within their form, fit, and functional constraints) into current fielded weapon systems. The six thrust area used to develop new fire suppression technologies include:

- risk assessment and selection methodology
- fire suppression principles
- technology testing methodologies
- new suppression concepts
- emerging technology advancements
- suppression optimization.

The nine fire suppression technology projects that have been funded for FY97 include:

- development of model fires for fire suppression research
- identification and proof testing of new total flooding agents
- mechanisms for ultra-high efficiency chemical suppressers
- flame inhibition by phosphorus containing compounds
- suppression effectiveness of aerosols and particles
- electrically charged water mist for extinguishment of fires
- development of self-atomizing forms of water
- dispersal liquid agent fire suppression schemes
- stabilization of flames.

POLICY IMPLICATIONS OF MONTREAL PROTOCOL DECISION VII/12 - Dr. Dan Verdonik and Mr. Phil D. Nenno discussed the policy implications of the Montreal Protocol Decision VII/12. This decision addresses control measures for parties not operating under Article 5 with respect to Halon and other agents for fire suppression. Policy implication of this decision include promoting the safe destruction of surplus halon, recommending the limiting of halon systems to only "critical applications", and advocating other environmental issues be included in determining halon alternatives. The destruction of halon is based on "environmental necessity" rather that technical or cost considerations.

GLOBAL WARMING POTENTIAL - At the policy discussion on Global Warming Potential, a Senior Environmental Official from the Environmental Protection Agency (EPA) added that his organization has underestimated the ability of industry and the scientific community to respond to the elimination of ODCs. Mandates of the Montreal Protocol were achieved quicker and at a lower cost than anticipated. In the future, one can assume that new goals will be tougher with shorter implementation times.

ALTERNATIVE SOLVENTS FOR CLEANING/DEGREASING - Mr. Gale Allen presented a briefing on a solvent replacement implemented at the Kennedy Space Center (KSC). KSC replaced CFC-113 used for vapor degreasing with an alternative process using an aqueous cleaner. The alternative process uses ultrasonic equipment with Brulin 815GD rather than the Navy Oxygen Cleaner (NOC). This process is expensive to implement and would be applicable only to an operation of the magnitude such as being worked at KSC. They are processing thousands of items but do have a problem with water entrapment in gauges and some other items. Water entrapment continues to be an issue when cleaning gauges and some other types of equipment when using aqueous cleaners.

For further details related to this conference, please contact Mr. John King at DSN 945-7391.

This article was produced by a report provided by Mr. John King to the Weapon System Pollution Prevention Working Group and to the MONITOR. Δ

SOLVENT SUBSTITUTION WORKSHOP UPDATE

The Seventh Annual International Solvent Substitution Workshop was held in Phoenix, Arizona, 03-06 December 1996. Summary of the keynote speakers and some of the topics covered at the workshop are summarized below.

Ms. Sherri Goodman, the Deputy Under Secretary of Defense for Environmental Security - presented the key note address. She emphasized that environmental, safety, and health (ESH) issues should be addressed as a way of reducing the environmental cost burden. Ms. Goodman noted that DoD spends one billion dollars annually for paint stripping and painting operations. The Air Force's share of this cost burden is seven hundred million dollars.

Ms. Drusilla Hufford, the Director of the Stratospheric Protection Division of EPA - addressed environmental regulations. She emphasized that the ODC elimination has proceeded much faster and more economical than had been expected. This success story has resulted from industrial and governmental cooperation and partnerships.

Mr. Bruce Jordan, Director of the EPA Emissions Standards Division - addressed the Aerospace National Emissions Standard for Hazardous Air Pollutants (NESHAP) rule making process and applicability of the process to other NESHAPs for other industries. Volatile organic carbon's (VOC's) are receiving a priority since EPA has identified that VOCs contribute to particulate matter. New rules have been advocated and expect tighter controls in the near future.

Mr. Michael Short of Green Seal - described the Green Seal listing. This is an environmental "UL" listing similar to a Quality Product List (QPL). A standard for a product would be developed for a material or product including environmental and performance standards. The standards are subject to expert and public review. Vendors will supply test results for Green Seal review for qualification. Products meeting the standard would be able to carry the Green Seal.

Mr. Steve Perez of Defense Supply Center Richmond (DSC-Richmond) - spoke of the DLA Environmentally Preferred Products Catalogue's growing list. They seek laboratory (independent or in-house) materials compatibility and other test results from vendors before listing in their catalogue.

Mr. Ronald Sibley of Defense Supply Center Richmond (DSC-Richmond) - addressed the ODS Reserve. They are confident in meeting refrigerant needs. Solvents such as 1-1-1 Trichloroethane and CFC-113 are stocked to meet needs for only a few years. Concerns on how the 1-1-1 Trichloroethane is stored were voiced.

Mr. Brian Ballew of SA-ALC/TIEM - presented an article titled "Facilitating Acquisition of Alternatives Through Performance Based Standards." Further details related to this presentation are summarized in a separate article (see page 10).

Other presentations at the workshop included information about solvents which have been developed to meet environmental and performance criteria. Vendors presented their success stories and information about the ability of their solvents to meet performance criteria. Several speakers spoke on the importance of safety and health as well as the environment when making substitutes. The organizers were discussing either expanding the scope of the conference to include Acquisition Pollution Prevention considerations or making them a separate workshop; no decisions or firm plans were made. For additional information about this workshop, please contact Mr. Brian Ballew at DSN 945-7391 or Commercial (210) 925-7391. Δ

HAZMAT INFORMATION EXCHANGE ON-LINE TOOL UPDATE

The HAZMAT Information Exchange On-Line Tool (IET) - a centralized library system for the collection, storage and retrieval of information to support HAZMAT reduction efforts - has been updated. Version 2.0 offers the following added features and improvements:

- Data available in all modules
- Print preview available in all modules
- Users may submit comments electronically

- Performance enhancements
- Drop-down lists to facilitate queries
- Capability to edit the previous query
- Keyboard shortcuts for mouse equivalents.

Users can download the latest version of the IET using the following Home Page address: <**http://www.brooks.af.mil/HSC/EMP/iet/iethome.htm**>. The pages that allow downloading are password protected and can only be downloaded if the user has the World Wide Web (WWW) password. Additionally, a new user can request a user ID and password. Other Home Page capabilities include reporting a problem, submitting an evaluation of the IET, or sending an e-mail.

The IET has the flexibility to be expanded to accommodate new requirements such as environmental, safety and health (ESH) information for weapon systems. The ability of the IET to be dynamic and responsive to new requirements and directives depends on user input. Users are requested to provide relevant data to the IET to maximize this tool's abilities to meet DoD's objectives of reducing duplication of effort, sharing lessons learned and maximizing resources across government agencies and industry in the management of hazardous materials.

For additional information, please contact Ms. Blanca Paredes, IET Program Manager, at DSN 240-5118/Comm (210) 536-5118 or Mr. Abner Almirudis at DSN 240-5447/Comm (210) 536-5447. The fax number is DSN 240-3228/Comm (210) 536-3228. The e-mail address is iet@emgate.brooks.af.mil.

Source: Ms. Blanca Paredes, HSC/EMP. Δ

Environment, Safety, and Occupational Health (ESOH) Services Available

- Air Quality and Pollution Control
- Assess and Reduce Health Risks
- Bio-Effects Center of Excellence
- Bioenvironmental Engineering Services
- Bio-Remediation Education
- Cognitive Abilities Assessment
- Community Noise Abatement
- Computer Based Training
- Contamination Monitoring and Characterization
- Cost Reduction of Remediation and Characterization
- Develop P2 and Compliance Technologies for Weapon Systems/Industrial Operations
- Education and Training Identification Requirements for All Career Fields
- Environmental Sciences
- Environmental and Health Analytical Services
- Environmental Risk Communication
- Epidemiology Services
- Ergonomically Designed Advanced Cockpit Design and Heads-Up Displays
- ESOH Awareness Training Tools
- ESOH Education and Training Duplication Reduction
- ESOH Training Development and Delivery
- Hazardous Waste Management
- Health Maintenance in Combat
- Health Promotion
- Health Risk Assessment
- Hearing Conservation
- Helmet Mounted Display Systems
- Human Factors Engineering
- Industrial Hygiene Consultations
- Intrinsic Radiation Surveys
- Laser Safety Radiation Services
- Laser, RF, and Acoustic Bio-Effects
- Life Cycle Cost Estimator
- Massive Human Performance Database
- Materials Toxicology Assessments
- Manpower, Personnel and Training (MPT) Integration for Weapon Systems
- Noise Effects Studies
- Noise Mitigation & Assessment
- Noise Modeling
- Non-Destructive Investigation Facility Surveys
- Nonionizing Radiation Studies
- Physical/Chemical Remediation
- Pollution Dispersion Modeling
- Population Research
- Preventive Medicine Clinical Psychology
- Public Health
- Radiation Abatement Services
- Radioanalytical Consultations
- Radioactive Waste Conformation
- Radon Assessment & Mitigation
- Reduce Use of Hazardous Materials
- Restoration Advisory Board Support
- Risk Communication
- Safe Ejection Envelopes of Ejection Seats
- Simulation Fidelity Design
- Site Characterization
- Statistical Analysis
- Structural Shielding Surveys
- Threat Assessment & Safety
- Toxicology Assessments & Studies
- Toxicology Methods Development
- Weapon Development Support
- Weapons Storage Area Decommissioning Surveys
- Weapons Supportability Design
- World-Wide Aeromedical Consultations

Call the ESOH Service Center at DSN 240-5454/Comm 210-536-5454 for additional information or points of contact.

MEETING NOTICE

A C-17 Expanded P2-IPT Meeting has been scheduled for 6-7 Feb 1997 in Long Beach, CA. The primary purpose of this meeting is to focus on specific base-level issues affecting the operations and maintenance of the C-17 Weapon System. The meeting will be held in the Best Western Golden Sails Golf and Conference Center and is scheduled to begin at 0800, 6 Feb 1997. Anyone interested in the C-17 P2 Program is welcome to attend. Please provide the name for each participant to Ms. Stephanie Costa, 310-496-7078, McDonnell Douglas Transport Aircraft, no later than COB 29 Jan 1997.

The C-17 Pollution Prevention (P2) IPT is making significant progress in reducing/eliminating hazardous materials required in the production, test, operation, and maintenance of the C-17. Base-level input into this process is crucial. Thus, the C-17 P2-IPT requests representation from impacts by environmental, safety and health related issues (i.e., SG, LG, and CE) from each operational base and MAJCOM (Charleston AFB, McChord AFB, Altus AFB, HQ AETC, HQ AMC, and HQ AFMC). Each installation and MAJCOM representative will be prepared to informally discuss their environmental status as related to the C-17 operation and maintenance (e.g., TRI data or HAZMAT tracking, P2 projects, EIAP status, top 5 concerns, project "wish list", etc.). The success of the meeting will depend on these base/MAJCOM inputs. Δ

UPCOMING EVENTS

Date	Meeting	Location	POC	Phone/Fax
21 Jan 97	ASC Environmental IPT Meeting	WPAFB, OH, Area B, Bldg. 8	Mr. Alex Brisken	DSN 785-3054 ext. 309
22-23 Jan 97	HAZMAT Pharmacy Workshop	Four Points Hotel, Fort Walton Beach, FL	Mr. Ken Duke	DSN 787-3487
27-30 Jan 97	Hazardous Materials and Waste Management Conference and Exhibition	Portland Hilton, Portland, OR	Ms. Lynne Holden, ADPA	(703) 522-1820 (703) 522-1885 (FAX)
30 Jan 97	B-2 Environmental Working Group Meeting	Whiteman AFB, MO	Capt Jason Herman	DSN 785-9502
03-07 Feb 97	U.S. Air Force - Air Combat Command Environmental Training Symposium and Exhibition	Hyatt Regency Hotel and Conference Center, Houston, TX	HQ ACC/CEV	(757) 764-9775 DSN 574-9775
05 Feb 97	Weapon System P2 Center Working Group VTC	1330-1430 Eastern Time	Maj. Bob Lang	DSN 478-8127
06-07 Feb 97	C-17 Expanded P2-IPT Meeting	Best Western Golden Sails and Conference Center, Long Beach, CA	Ms. Stephanie Costa	(310) 496-7078
24-28 Feb 97	Fundamentals of Industrial Hygiene	Renaissance Hotel, LaJolla, CA	Mr. Phillip Wright	(703) 849-8888
04-06 Mar 97	Weapon System P2 Center Working Group Conference - 6th Joint Solutions to Common Problems	AFFTC, Edwards AFB, CA	Capt Saroya Follender	DSN 527-1433 DSN 527-6145 (FAX)
12-13 Mar 97 Tentative	Coating Technology Screening Committee Meeting	Eglin AFB, FL	Mr. Jim Kampe	DSN 785-3370
24-28 Mar 97	1997 Air Force Corrosion Program Management Conference	Crown Plaza, Macon, GA	CMSgts Jett/McKenna	DSN 468-3284
02 Apr 97	Weapon System P2 Center Working Group VTC	1100-1200 Eastern Time	Maj Bob Lang	DSN 478-8127
07-10 Apr 97	23rd Environmental Symposium and Exhibition	Ernest N. Morial Convention Center, New Orleans, LA	Ms. Carey M. Jagels ADPA	(703) 247-2578 (703) 522-1885 (FAX)
05-08 May 97	Global Demilitarization Conference	Reno, Nevada	ADPA	(703) 522-1820
06-08 May 97	Halon Options Technical Working Conference	Sheraton Old Town, Albuquerque, NM	Ms. Donna Chavez	(505) 272-7260 (505) 272-7203 (FAX)
07 May 97	Weapon System P2 Center Working Group VTC	1100-1200 Eastern Time	Maj Bob Lang	DSN 478-8127
19-22 May 97	6th Biennial Joint Depot Environmental Panel Workshop, Conference and Exhibition	Town and Country Hotel, San Diego, CA	Mr. Gary Smith	(513) 656-2772 (DSN 986) e-mail: smith@jdmag.wpafb.af.mil